

PAT-NO: JP361222939A
DOCUMENT-IDENTIFIER: JP 61222939 A
TITLE: HEATING TROUGH
PUBN-DATE: October 3, 1986

INVENTOR-INFORMATION:

NAME	COUNTRY
TAKADA, MASAYUKI	
TAKAGI, RYOJI	
BESSHO, NOBORU	

ASSIGNEE-INFORMATION:

NAME	COUNTRY
NIPPON STEEL CHEM CON/A LTD	

APPL-NO: JP60061803
APPL-DATE: March 28, 1985

INT-CL (IPC): C03B037/085

US-CL-CURRENT: 65/346

ABSTRACT:

PURPOSE: The base material which forms the outer structure of the trough is provided, on its inner surface, with an insulating layer, a specific heat- generating layer and a protecting layer, so that the slag is prevented from solidifying in the inner surface of the trough and rock wool of high quality is obtained without coating.

CONSTITUTION: The base I of a heat-resistant material such as iron in lined with a fire-proofing material such as ceramic fibers in its inner surface to form an insulating layer 2, the layer 2 is provided on its inner surface, with a heat-generating layer 3 which is prepared by embedding electric heaters 5 in a refractory material such as high alumina castable refractory, further, a protecting layer 4, which contacts with the slag is formed with a heat-resistant, corrosion-resistant material such as carbon plates on the heat-generating layer 3. As a refractory for the insulating layer 2, are cited silica fiber, alumina fiber carbon fiber in addition to ceramic fiber and silicon carbide or high alumina is used as a heat-resistant, corrosion-resistant material for the protecting layer 4.

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L2: Entry 1 of 2

File: JPAB

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Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
Draw Desc	Image								

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☐ 2. Document ID: JP 61222939 A

L2: Entry 2 of 2

File: DWPI

Oct 3, 1986

DERWENT-ACC-NO: 1986-301535
DERWENT-WEEK: 198646
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TITLE: Heated trough for molten material transport - has heating elements embedded inside insulation layer

PATENT-ASSIGNEE:

ASSIGNEE

NIPPON STEEL CHEM CO

CODE

YAWH

PRIORITY-DATA: 1985JP-0061803 (March 28, 1985), 1985JP-0061903 (March 28, 1985)

PATENT-FAMILY:

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JP 61222939 A	October 3, 1986		003	

APPLICATION-DATA:

PUB-NO	APPL-DATE	APPL-NO	DESCRIPTOR
JP61222939A	March 28, 1985	1985JP-0061903	

INT-CL (IPC): C03B 37/08

ABSTRACTED-PUB-NO: JP61222939A

BASIC-ABSTRACT:

The base, insulation formed on the inside of the base, heating layer including refractory embedded with heating elements formed on the inside of the insulation and protecting layer that is formed on the inside of the heating layer to contact flow of molten matter.

USE - By generating the heating elements, molten matter can flow without being solidified. Applicable to prodn. of fibres.

CHOSEN-DRAWING: Dwg.0/0

TITLE-TERMS: HEAT TROUGH MOLTEN MATERIAL TRANSPORT HEAT ELEMENT EMBED INSULATE LAYER

DERWENT-CLASS: F01 L01

CPI-CODES: F01-C01; F01-C07; F01-D09; L02-B08;

SECONDARY-ACC-NO:

CPI Secondary Accession Numbers: C1986-130707

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
Draw	Desc	Image							

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⑩ 日本国特許庁 (JP)

⑪ 特許出願公開

⑫ 公開特許公報 (A)

昭61-222939

⑬ Int.Cl.⁴

識別記号

庁内整理番号

⑭ 公開 昭和61年(1986)10月3日

C 03 B 37/085

8216-4G

審査請求 未請求 発明の数 1 (全3頁)

⑮ 発明の名称 加熱トラフ

⑯ 特 願 昭60-61803

⑰ 出 願 昭60(1985)3月28日

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⑳ 代 理 人 弁理士 小松 秀岳 外1名

PTO 2003-511

S.T.I.C. Translations Branch

明 細 書

1. 発明の名称

加熱トラフ

2. 特許請求の範囲

トラフの外形を形成する基材内面に断熱層を設け、その内面に発熱体を埋設した耐火物からなる発熱層を形成し、その内面に溶解材料流と接する保護層を設けてなる加熱トラフ。

3. 発明の詳細な説明

産業上の利用分野

この発明は鉱物繊維、例えばロックウールの原料を溶解した溶解材料流（いわゆるノロ）を流すための樋（トラフ）に関する。

従来の技術

ロックウール等の鉱物繊維の製造にあたり、高炉スラグ又は玄武岩、輝緑岩等の天然岩石を電気炉で溶解するか、或いは原料をコークスと混ぜて衝風式溶解炉（キューボラ）で溶解し、その溶解材料（ノロ）を出湯口から樋（トラフ）により製綿装置に誘導し、製綿装

置でロックウールを製造することが従来から実施されている。

ところで、上記トラフは第2図に示すような断面がL字形で内部が空洞の鉄皮からなる基材1が外形を形成し、この内部空洞が冷却水の循環路6になっているものである。

このような構造のトラフでは、トラフ内面との接触面に凝固物による被覆（いわゆるノロコーティング）が多量に形成され、それを排除するときにロックウール製品内にノロ塊が混入することになり、更に、トラフ先端にコーティングが発生すると製綿装置内のノロ落下位置が変動する。この落下位置の変動は製品の品質に大きな影響があり、操業上ならびに製品の品質維持から重大な問題になっていた。

発明が解決しようとする問題点

この発明は、上記ノロコーティングが発生しないような構造のトラフを提供しようとするものである。

問題点を解決するための手段

上記問題を解決するためのこの発明のトラフの成は、トラフの外形を形成する基材内面に断熱層を設け、その内面に発熱体を埋設した耐火物からなる発熱層を形成し、その内面に溶解材料流（ノロ）と接する保護層を設けてなる加熱トラフである。

図面を参照して具体的に説明すると、第1図はこの発明のトラフの横断面図であって、耐火性材料例えば鉄製の基材1の内面に耐火性断熱材例えばセラミックファイバーを張りつけた断熱層2を形成し、その内面に耐火物例えば高アルミナ系キャスト耐火物中に、例えばカンタル線（Mo-Si系発熱体）製の電熱体5を埋設した発熱層3を設け、その上面、すなわち最も内面にノロと接する表面層4を耐熱・耐食性材料例えばカーボンプレートで形成したものである。

上記断熱層2の耐火性断熱材としてはセラミックファイバーの外にシリカファイバー、

らなる断熱層2、アルミナ系キャスト耐火物にカンタル線からなる電熱体5を埋設した発熱層3、最内部に表面層4としてカーボンプレートを張ったトラフにおいて、このカーボンプレートの表面温度、ヒーター（電熱体）の温度および鉄皮温度を測定したとき、それぞれの関係は下記の表に示すとおりであった。

表（温度の単位は℃）

表面温度	ヒーター温度	鉄皮温度
355	500	155
520	700	230
800	1000	320

また、このトラフで実際にノロを誘導する実験では、キュボラからの出湯2時間前からヒーターを1000℃にして加熱しておき、出湯後、流出するノロの温度が次第に上昇するに従ってヒーターへの入力を下げ、最終的に800℃で運転をした。その結果14時間の間ノロコーティングの掃除は一度もする必要がな

アルミナファイバー、カーボンファイバー等が用いられ、表面層4の耐熱・耐食性材としてはカーボンプレートの外にシリコンカーバイド、ハIALミナ等が用いられる。

作 用

上記構造を有するこの発明のトラフによれば、電熱体5に電流を通すことによって、それから発生する熱で、ノロと接する表面層4を高温に保つことができる。したがって、ノロがトラフ内面で凝固することがないのでコーティングが発生しない。その結果、ノロ塊が製綿装置内に流入することがなく、かつ、トラフの先端部にコーティングが生成しないので製綿装置におけるノロの落下点が安定し、高品質のロックウールを製造することができる。

以下実施例によって、この発明のトラフの性能を具体的に説明する。

実施例

鉄製基材1内面にセラミックファイバーが

かった。

発明の効果

以上説明したように、この発明のトラフによればノロコーティングの発生が防止でき、したがって、高品質の鉱物繊維を安定して製造することができる。

4. 図面の簡単な説明

第1図は、この発明のトラフの一例の横断面図、

第2図は、従来のトラフの横断面図である。

1…基材、2…断熱層、3…発熱層、

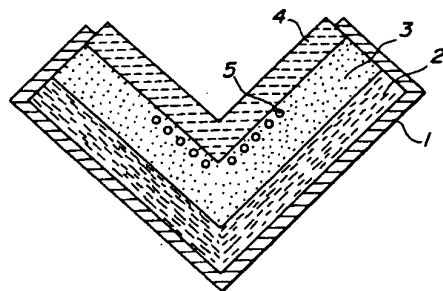
4…表面層、5…電熱体。

特許出願人 新日鐵化学株式会社

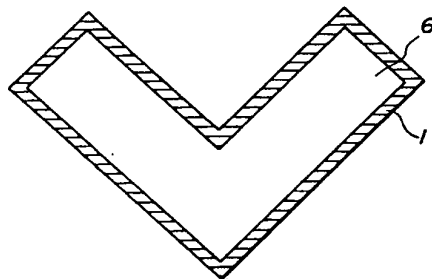
代理人 弁理士 小 松 秀 岳

代理人 弁理士 旭 宏

第 1 図



第 2 図



PTO: 2003-511

Japanese Published Unexamined (Kokai) Patent Application No. S61-222939, published October 3, 1986; Application No. S60-61803, filed March 28, 1985; Int. Cl.⁴: C93B 37/085; Inventor(s): Masayuki Takada et al.; Assignee: Nippon Steel Chemical Corporation; Japanese Title: Kanetsu Torafu (Heating Trough)

Specification

1. Title of Invention

Heating Trough

2. Claim

A heating trough, characterized by providing the following layers: a heat insulating layer in the inner surface of a substrate that forms the outer shape of the trough; a heat generating layer made of a fire retardant material with a heat generating element embedded in the inner surface of the heat insulating layer; a protective layer in the inner surface of the heat generating layer, which is in contact with a fused material stream.

3. Detailed Description of the Invention

[Field of Industrial Application]

This invention pertains to troughs for running a fused material stream (so-called slag) wherein the raw materials of mineral fibers such as rock wool are fused.

[Prior Art]

As for a conventional production of the mineral fibers, blast furnace slag or natural

rocks such as basalt and diabase are fused by using electric furnaces or the raw materials are mixed with coke, and the mixtures are fused in air blast fusion furnaces (cupolas). The slag is introduced into drafts making devices from tap holes via troughs so as to produce rock wool.

The troughs are designed in Fig.2 as follow. A substrate 1 whose cross-section is an L shape and whose interior is made of a hollow shell forms the outer shape. This inner hollow functions as a circulating circuit 6 for cooling water.

As for the trough with this structure, a large amount of a coating (so-called a slag coating) due to a coagulated substance is formed to the contact surface with the inner surface of the trough. When the slag coating is cleaned up, a slag lump is mixed into a rock wool product. If a coating occurs to the tip of the trough, a falling location of the slag inside the drafts making device displaces. The displacement of the falling location gives a significant effect on the quality of the product. This effect is critical with respect to the operation and the maintenance of the product quality.

[Problem of Prior Art to Be Addressed]

The present invention is produced to offer a trough with a structure to prevent a generation of the slag coating.

[Measures to Solve the Problem]

In order to eliminate the aforementioned disadvantage, the invention is as a heating trough, characterized by providing the following layers: a heat insulating layer in the inner

surface of a substrate that forms the outer shape of the trough; a heat generating layer made of a fire retardant material with a heat generating element embedded in the inner surface of the heat insulating layer; a protective layer in the inner surface of the heat generating layer, which is in contact with slag.

As the invention is described in detail with reference to the drawings, Fig.1 is a horizontal cross-sectional view illustrating a trough. A heat insulating layer 2 with a fire retardant heat insulating material such as a ceramic fiber lined in the inner surface of heat insulating iron substrate 1 is formed. A heat generating layer 3 with a kanthal wire (a Mo-Si heat generating element) heating element 5 embedded in the inner surface of heat insulating layer 2, such as a high alumina castable fire retardant material, is provided. A surface layer 4 that is brought into contact with slag is formed onto the upper surface of heat generating layer 3, more specifically the inner most surface, by using a heat and corrosion resistant material such as a carbon plate.

Other than the ceramic fiber, a silica fiber, an alumina fiber and a carbon fiber are used as fire retardant heat insulating materials for heat insulating layer 2. Other than the carbon plate, silicon carbide and high alumina are used as heat and corrosion resistant materials for surface layer 4.

[Effect]

According to the trough of the invention that has the aforementioned structure, by running current to heating element 5, surface layer 4 that is in contact with slag is maintained at a high temperature using a heat generated from heating element 5. Accordingly, the slag will

not solidify in the inner surface of the trough. No coating occurs. As a result, a slag lump will not flow into the drafts making device, and no coating occurs to the tip of the trough. The falling point of the slag in the drafts making device is stabilized. Subsequently, high quality rock wool can be produced.

Using the embodiment, the performance of the trough by the invention is described hereinbelow in detail.

[Embodiment]

Using a trough that comprises the following layers: ceramic fiber heat insulating layer 3 in the inner surface of iron substrate 1; heat generating layer 3 with kanthal wire heating element 5 embedded in an alumina castable fire retardant material; a carbon plate lined on the most inner section as surface layer 4, the surface temperature of the carbon plate, the temperature of the heater (heating element) and the shell temperature are measured, the table as shown below indicates a relationship among these temperatures.

Table (°C as the temperature unit)

Surface temperature	Heater temperature	Shell temperature
(Please refer to the original descriptions)		

At a testing that actually induces slag by the trough, the heater is heated to 1000°C in

advance 2 hours before slag is ejected from a cupola. After the ejection of the slag, an input to the eater is reduced as the temperature of the ejected slag gradually increases. The operation is finally performed at 800°C. As a result, no cleaning is required for 14 hours to remove a slag coating.

[Advantageous Result of the Invention]

As described above, according to the trough of the invention, the generation of a slag coating is prevented. Thus, a high quality mineral fiber is stably produced.

4. Brief Description of the Invention

Fig.1 is a horizontal cross-sectional view illustrating an example of a trough of the invention. Fig.2 is a horizontal cross-sectional view illustrating prior art trough.

1...Substrate

2...Heat insulating layer

3...Heat generating layer

4...Surface layer

5...Heater

**Translations Branch
U.S. Patent and Trademark Office
11/13/02
Chisato Morohashi**